AMENDMENT TO SPECIFICATION

[Deleted material is struck-through and added material is underlined]

On page 1, after line 2, add section title:

APPARATUS AND METHOD TO INCREASE DENSITY AND ENERGY OF HYDROGEN, OXYGEN, AND OTHER GASES

BACKGROUND OF THE INVENTION

Hydrogen is emerging as one of the primary alternative fuels for the large scale replacement of gasoline and other fossil fuels via its use as automotive fuel or in fuel cells. However, hydrogen is a fuel with one of the lowest specific density and energy content among all available fuels. In fact, hydrogen has the specific density of about two atomic mass unit (2 a.m.u.) and the energy content in British Thermal Units (BTU) per standard cubic foot (scf) of about 300 BTU/scf. By comparison, gaseous hydrocarbons can have specific densities and energy content up to eight times these values, as in the case of acetylene.

On page 10, after line 24, add section title:

SUMMARY OF THE INVENTION

One embodiment of the invention is an apparatus and method for increasing a specific density and an energy content of a gas comprising providing a pressure resistant piping system equipped with means for closing and opening said piping system, the means typically being valves; providing means for filling up said piping system with a gas and means for compressing said gas to a desired pressure; providing at least one pair of electrodes placed within said piping system and capable of delivering an electric arc within an interior of the piping system; providing means for delivering an electric power to each of said at least one pair of electrodes; providing means for recirculating said gas through said electric arc; providing means for collecting a resultant processed gas; and filling said piping system with the gas, recirculating the gas through the electric arc generated by the at least one pair of electrodes and collecting the resultant processed gas, wherein the resulting processed gas has a specific density and an energy content bigger than corresponding values of the gas originally first filled into the piping system.

On page 14, after line 19, add section title:

DETAILED DESCRIPTION OF THE INVENTION

As indicated earlier, the magnetic polarization of the orbitals of peripheral atomic electrons requires extremely strong magnetic fields of the order of billions or trillions of Oersteds which are simply not possible with current technologies in large scale, that is at distances of the order of inches or feet, even with the use of superconducting solenoids cooled with the best available cryogenic technologies.

On page 15, lines 4-6:

The only possible, industrially useful means of achieving magnetic fields of the needed very high intensity are those based on large direct current (DC) measured in Amperes (A) when considered at atomic distances. In fact, with respect to Fig. 6 the magnetic field created by a rectilinear conductor with current I at a radial distance r is given by the law B = kI/r, where the constant k in absolute electromagnetic unit is 1. It then follows that, for current in the range of ~~10^3~~ 10^3 and distances of the order of the size of atoms r = ~~10^-8~~ 10^{-8} cm, the intensity of the magnetic fields H is of the order of ~~10^13~~ 10^{13} Oersted, thus having intensity values fully sufficient to cause the magnetic polarization of the orbitals of peripheral atomic electrons.

On page 16, lines 22, 23, 26, 27, 28, 29, 33:

A first preferred embodiment of this invention is depicted in Fig. 7 and comprises: one, two or several pairs of positively and negatively charged electrodes 1 and 2, 3 and 4, ~~shown in the figures,~~ here assumed to be composed of tungsten rods of 1/2" outside diameter and 3" in length with tip configuration depicted in Fig. 8 as described below; commercially available DC power units of 50 Kwh **(not shown in the drawings for simplicity)**, one per each electrode pair ~~not shown in the figure for simplicity~~; a pipe system 5 typically of 1/2" internal diameter and 3/4" outside diameter ~~in the shape of the figure~~ composed of a diamagnetic metal or other nonconducting material suitable to withstand an internal pressure of least 4, 500 psi; said electrode pairs are placed as a fixed part of piping system 5 via pressure resistant seals 16 in such a way to create the biggest possible gaps **19** ~~20, 21, etc.~~, permitted by the selected 50 Kwh power unit and the selected gas at the selected operating pressure, which gap, for the case of hydrogen and oxygen (gas 14) at the selected operating features is of the order of 1/2"; four on-off high pressure valves 6, 7, 8, 9 at the indicated locations; three high pressure pumps 10, 11, and 12; two tanks 13, 15 of at least one scf each capable of withstanding at least 4,500 psi and located in line with piping system 5; and two commercially available high pressure gas cylinders 17, 18 connected as shown in the piping system 5.

On page 19, lines 3 and 8:

The difference between the embodiment of Fig. 9 and that of Fig. 7 is the following. The latter embodiment acts according to the circular configuration of the magnetic field of Fig. 6, while the former embodiment acts according to a linear configuration of the magnetic field along the symmetry axis of the solenoid with intensity $B = nI/r$, where n is the number of turns, I is the current in Amps and r is the radius of said tube 201. It is evident that the linear alignment of magnetically polarized atoms along the direction of its flow favors the creation of into magnecules as compared to the circular alignment of Fig. 6, particularly when the equipment is operated, for instance, at pulses of 50,000 A with a radius of tube 201 of **10^{-5}** ~~**10^-5**~~ mm.

However, the selection of the preferred equipment depends on the specific needs. For instance, the embodiment of Fig. 9 cannot breakdown the original molecules, thus forming magnecules essentially composed of molecules with individual polarized atoms. By comparison, the electric arc of **the apparatus depicted in Fig. 7** ~~**Fig. 6**~~ does indeed separate conventional molecules, thus forming magnecules which generally contains atoms, dimers and molecules.